What is claimed is:

1. A voltage-controlled tunable comb-ring type filter comprising:

a first resonator;

a second resonator coupled to said first resonator;

a third resonator coupled to said second resonator and cross coupled to said first resonator.

2. The voltage-controlled tunable comb-ring type filter of claim 1, wherein said first resonator is a combline type resonator.

3. The voltage-controlled tunable comb-ring type filter of claim 1, wherein said second resonator is a ring type resonator.

4. The voltage-controlled tunable comb-ring type filter of claim 1, wherein said third resonator is a combline type resonator.

5. The voltage-controlled tunable comb-ring type filter of claim 1, further comprising an input transmission line connected with said first resonator.

6. The voltage-controlled tunable comb-ring type filter of claim 1, further comprising an output transmission line connected with said third resonator.

7. The voltage-controlled tunable comb-ring type filter of claim 1, wherein the cross coupling mechanism between said first resonator and said third resonator is through a transmission line shorted on both ends.

8. The voltage-controlled tunable comb-ring type filter of claim 1, wherein the means for cross coupling said third resonator to said first resonator is by placing said second resonator in a different layer.

9. The voltage-controlled tunable comb-ring type filter of claim 1, wherein the means for cross coupling said third resonator to said first resonator is by keeping said first resonator and said third resonator relatively straight and placing the second resonator such that cross coupling occurs between said first resonator and said second resonator by virtue of the proximity of all three resonators to each other.

10. The voltage-controlled tunable comb-ring type filter of claim 1, wherein at least one of said resonators includes at least one variable capacitor.

11. The voltage-controlled tunable comb-ring type filter of claim 1, wherein each of said first, second and third resonators includes at least one variable capacitor.

12. The voltage-controlled tunable comb-ring type filter of claim 10, further comprising biasing lines associated with said variable capacitor to provide bias to said variable capacitors.

13. The voltage-controlled tunable comb-ring type filter of claim 12, wherein said biasing lines include four resistors to block any RF leakage into said DC biasing lines.

14. The voltage-controlled tunable comb-ring type filter of claim 1, wherein any or all of said resonators can be implemented in a microstrip or stripline form.

15. The voltage-controlled tunable comb-ring type filter of claim 1, wherein any or all of said resonators can be bent towards each other to reduce the size of said filter.

16. The voltage-controlled tunable comb-ring type filter of claim 1, wherein in any or all of said resonators DC blocking capacitor are used at

the end of said any or all of said resonators in order to bias any or all of said resonators.

17. The voltage-controlled tunable comb-ring type filter of claim 10, further comprising a ring resonator circuit with a DC blocking capacitor at the opposite end of said variable capacitor position in order to make the whole structure symmetric.

18. The voltage-controlled tunable comb-ring type filter of claim 10, wherein said variable capacitor is a tunable dielectric capacitor.

19. The voltage-controlled tunable comb-ring type filter of claim 18, wherein said tunable dielectric capacitor includes a substrate having a low dielectric constant with planar surfaces.

20. The voltage-controlled tunable comb-ring type filter of claim 19, further comprising a tunable dielectric film on said substrate made from a low loss tunable dielectric material.

22. The voltage-controlled tunable comb-ring type filter of claim 1, further comprising a metallic electrode with predetermined length, width, and gap distance associated with at least one resonator.

23. The voltage-controlled tunable comb-ring type filter of claim 21, further comprising a low loss isolation material used to isolate an outer bias metallic contact and the metallic electrode on said tunable dielectric material.

24. The voltage-controlled tunable comb-ring type filter of claim 10, wherein the center frequency of the filter is tuned by changing the varactor capacitance controlled by changing the voltage applied to said varactor.

25. The voltage-controlled tunable comb-ring type filter of claim 10, wherein said variable capacitor is a tunable MEMS capacitor.

26. The voltage-controlled tunable comb-ring type filter of claim 25, wherein said tunable MEMS capacitor is in a parallel or interdigital plate topology.

27. The voltage-controlled tunable comb-ring type filter of claim 10, wherein said variable capacitor is a tunable semiconductor diode varactor.

28. The voltage-controlled tunable comb-ring type filter of claim 8, further comprising a means of inter-resonator coupling between adjacent and non-adjacent resonators in said filters.

29. A method of filtering signals using a voltage-controlled tunable comb-ring type filter comprising the steps of:

providing a first resonator;

coupling a second resonator to said first resonator;

coupling a third resonator to said second resonator and cross coupling third resonator to said first resonator.

30. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein said first resonator is a combline type resonator.

31. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein said second resonator is a ring type resonator.

32. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein said third resonator is a combline type resonator.

33. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, further comprising an input transmission line connected with said first resonator.

34. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, further comprising the step of providing an output transmission line connected with said third resonator.

35. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein the cross coupling mechanism between said first resonator and said third resonator is through a transmission line shorted on both ends.

36. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein the means for cross coupling said third resonator to said first resonator is by placing said second resonator in a different layer.

37. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein the means for cross coupling said third resonator to said first resonator is by keeping said first resonator and said third resonator relatively straight and placing the second resonator such that cross coupling occurs between said first resonator and said second resonator by virtue of the proximity of all three resonators to each other.

38. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein at least one of said resonators includes at least one variable capacitor.

39. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein each of said first, second and third resonators includes at least one variable capacitor.

40. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, further comprising the step of providing bias to said variable capacitors by providing biasing lines associated with said variable capacitor.

41. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein said biasing lines include four resistors to block any RF leakage into said DC biasing lines.

42. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein any or all of said resonators can be implemented in a microstrip or stripline form.

43. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein any or all of said resonators can be bent towards each other to reduce the size of said filter.

44. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, wherein in any or all of said resonators DC blocking capacitor are used at the end of said any or all of said resonators in order to bias any or all of said resonators.

45. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 38, further comprising the step of providing a ring resonator circuit with a DC blocking capacitor at the opposite end of said variable capacitor position in order to make the whole structure symmetric.

46. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 38, wherein said variable capacitor is a tunable dielectric capacitor.

47. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 46, wherein said tunable dielectric capacitor includes a substrate having a low dielectric constant with planar surfaces.

48. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 47, further comprising the step of providing a tunable dielectric film on said substrate made from a low loss tunable dielectric material.

49. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, further comprising a metallic electrode with predetermined length, width, and gap distance associated with at least one resonator.

50. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 48, further comprising the step of providing a low loss isolation material used to isolate an outer bias metallic contact and the metallic electrode on said tunable dielectric material.

51. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 38, wherein the center frequency of the filter is tuned by changing the varactor capacitance controlled by changing the voltage applied to said varactor.

52. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 38, wherein said variable capacitor is a tunable MEMS capacitor.

53. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 52, wherein said tunable MEMS capacitor is in a parallel or interdigital plate topology.

54. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 38, wherein said variable capacitor is a tunable semiconductor diode varactor.

55. The method of filtering signals using a voltage-controlled tunable comb-ring type filter of claim 29, further comprising the step of providing a means of inter-resonator coupling between adjacent and non-adjacent resonators in said filters.

56. A voltage-controlled tunable comb-ring type filter comprising:

a plurality of resonators, said plurality of resonators comprising:

a first of at least two combline type resonators;

a first of at least one ring type resonator coupled to said first of at least two combline type resonator;

a second of said at least two combline type resonator coupled to said first of at least one ring type resonator and cross coupled to said first of at least two combline type resonators;

at least one of said plurality of resonators includes at least one variable capacitor;

an input transmission line connected with at least one of said plurality of resonators;

an output transmission line connected with at least one of said resonators;.

57. The voltage-controlled tunable comb-ring type filter of claim 56, wherein the cross coupling mechanism between said second of said at least two combline type resonators with said first of at least two combline type resonators is through a transmission line shorted on all ends of said at least two combline type resonators.

58. The voltage-controlled tunable comb-ring type filter of claim 57, wherein the means for cross coupling said second of said at least two combline type resonators with said first of at least two combline type resonators is by placing said first of at least one ring type resonator in a different layer.

59. The voltage-controlled tunable comb-ring type filter of claim 57, wherein the means for cross coupling said second of said at least two combline type resonators with said first of at least two combline type resonators is by keeping all of said at least two combline type resonators

relatively straight and placing said first of at least one ring type resonator such that cross coupling occurs between said plurality of resonators by virtue of the proximity of all of said plurality of resonators.

60. The voltage-controlled tunable comb-ring type filter of claim 57, further comprising biasing lines associated with said variable capacitor to provide bias to said variable capacitors.

61. The voltage-controlled tunable comb-ring type filter of claim 60, wherein said biasing lines include four resistors to block any RF leakage into said DC biasing lines.

62. The voltage-controlled tunable comb-ring type filter of claim 57, wherein any or all of said resonators can be implemented in a microstrip or stripline form.

63. The voltage-controlled tunable comb-ring type filter of claim 57, wherein any or all of said resonators can be bent towards each other to reduce the size of said filter.

64. The voltage-controlled tunable comb-ring type filter of claim 57, wherein in any or all of said resonators DC blocking capacitor are used at

the end of said any or all of said resonators in order to bias any or all of said resonators.

65. The voltage-controlled tunable comb-ring type filter of claim 57, further comprising a ring resonator circuit with a DC blocking capacitor at the opposite end of said variable capacitor position in order to make the whole structure symmetric.

66. The voltage-controlled tunable comb-ring type filter of claim 57, wherein said variable capacitor is a tunable dielectric capacitor.

67. The voltage-controlled tunable comb-ring type filter of claim 66, wherein said tunable dielectric capacitor includes a substrate having a low dielectric constant with planar surfaces.

68. The voltage-controlled tunable comb-ring type filter of claim 67, further comprising a tunable dielectric film on said substrate made from a low loss tunable dielectric material.

69. The voltage-controlled tunable comb-ring type filter of claim 57, further comprising a metallic electrode with predetermined length, width, and gap distance associated with at least one resonator.

70. The voltage-controlled tunable comb-ring type filter of claim 66, wherein the center frequency of the filter is tuned by changing the varactor capacitance controlled by changing the voltage applied to said varactor.

71. The voltage-controlled tunable comb-ring type filter of claim 57, wherein said variable capacitor is a tunable MEMS capacitor.